With MVAPICH and Intel OpenMP

Category: Porting to Pleiades

DRAFT

This article is being reviewed for completeness and technical accuracy.

Building Applications

To build an MPI/OpenMP hybrid executable using MVAPICH and Intel's OpenMP libraries, use *mpif90, mpicc, mpicxx* with the *-openmp* flag.

```
%module load comp-intel/11.1.072  mpi-mvapich2/1.4.1/intel
%mpif90 -o your_executable prog.f90 -openmp
```

Running Applications

With MVAPICH, a user's environment variables (such as VIADEV_USE_AFFINITY and OMP_NUM_THREADS) are not passed in to mpiexec, thus they need to be passed in explicitly, such as with /usr/bin/env.

Here is an example on how to run a MVAPICH/OpenMP hybrid code with a total of 12 MPI processes and 2 OpenMP threads per MPI process:

```
#PBS -lselect=3:ncpus=8:mpiprocs=4:model=neh

module load comp-intel/11.1.072 mpi-mvapich2/1.4.1/intel

mpiexec /usr/bin/env VIADEV_USE_AFFINITY=0 OMP_NUM_THREADS=2 ./your_executable
```

Performance Issues

Setting the environment variable VIADEV_USE_AFFINITY to 0 disables CPU affinity because MVAPICH does its own pinning. Setting it to 1 actually causes multiple OpenMP threads to be placed on a single processor.

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